



The Effect of Breastfeeding Training Based on the Theory of Planned Behavior on the Continuation of Exclusive Breastfeeding in Drug-Dependent Mothers: A Randomized Clinical Trial

Fereshteh Sadeghi¹, Gholam-Hosein Zarifnejhad², Monir Ramezani^{3,4*}, Jamshid Jamali⁵

Abstract

Objectives: Considering the low rate of exclusive breastfeeding in mothers using drugs and the role of behavioral intention as one of the effective factors on breastfeeding, the present study aimed to determine the impact of breastfeeding training based on the theory of planned behavior on the continuation of exclusive breastfeeding in drug-dependent mothers.

Materials and Methods: This clinical trial was performed in three hospitals of Mashhad in 2018. To this end, 52 drug-abusing mothers were randomly divided into experimental and control groups. The intervention protocol consisted of four separate training sessions with an emphasis on the theory of planned behavior. The follow-up process was performed 2 and 4 months after delivery, and the theory of planned behavior and breastfeeding continuity questionnaire was completed accordingly. Data were analyzed by the SPSS (version 16) using the independent t test and chi-square, Mann-Whitney, Friedman, and Wilcoxon tests.

Results: Two months after delivery, 88.5% and 3.8% of mothers of the intervention and control groups performed exclusive breastfeeding while this rate was 65.4% and 0.0% four months after delivery, respectively. The results of the chi-square test showed a significant difference between the two groups at 2 and 4 months ($P < 0.001$). Two months after delivery, the average score of maternal performance on the continuation of exclusive breastfeeding was 91.8 ± 9.2 and 50.8 ± 24.5 in the intervention and control group although it was 89.0 ± 8.7 and 31.0 ± 15.9 4 months after delivery, respectively. Based on the results of the Wilcoxon test, significant differences were found between the groups after 2 and 4 months ($P < 0.001$). Eventually, the average score of all constructs of the planned behavior theory improved immediately after the intervention, and 2 and 4 months after delivery in the intervention group ($P < 0.001$).

Conclusions: Thus, the implementation of breastfeeding training based on the theory of planned behavior is recommended for drug-dependent mothers to continue exclusive breastfeeding.

Keywords: Theory of planned behavior, Exclusive breastfeeding, Drug-dependent mothers

Introduction

Breastfeeding is essential for the proper growth of the infant during the first two years of life (1). Unfortunately, only 36% of infants are exclusively breastfed over the world (2m3). The American Academy of Pediatrics and the American Academy of Family Physicians recommends that exclusive breastfeeding be continued for the first six months of life and up to one year of age with supplemental nutrition unless breastfeeding is contraindicated for some medical reasons including the use of illicit drugs such as amphetamines, crack, crystals, benzodiazepines, marijuana, cocaine, alcohol, and other industrial drug substances (4).

One of the problems in breastfeeding is related to mothers who use narcotic drugs (5, 6), and neonatal deprivation syndrome (NAS) is one of the most common

problems associated with pregnant women who use narcotic drugs (7,8). Breastfeeding is considered an essential part of supportive care in the treatment of NAS (9-11).

Despite the beneficial roles of breastfeeding in infants born to drug-abusing mothers, exclusive breastfeeding has received little attention in this population (11,12).

The identification of factors influencing exclusive breastfeeding could help in designing interventions that can promote this behavior. Pregnant mothers' intention to breastfeed is one of the predictors of breastfeeding (13-15). The theory of planned behavior is one of the theories of health education that assesses behavioral intention, which is, in turn, influenced by attitude toward behavior, subjective norms, and perceived behavioral control (16).

Based on the literature review, no study was found

Received 23 August 2020, Accepted 26 December 2020, Available online 6 May 2021

¹School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran. ²Department of Community Health Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran. ³Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran. ⁴Department of Pediatric Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran. ⁵Department of Biostatistics and Epidemiology, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran.

*Corresponding Author: Monir Ramezani, Email: ramezanimn@mums.ac.ir



Key Messages

- ▶ Continuation of exclusive breastfeeding is low in drug-dependent mothers and fails in the first 6 months after birth.
- ▶ Implementation of breastfeeding training based on the theory of planned behavior has a significant impact on drug-dependent mothers to continue exclusive breastfeeding.
- ▶ After the implementation of the breastfeeding training based on the theory of planned behavior and two and four months later, there was a significant difference between experimental and control groups with respect to the awareness, attitude, perceived behavioral control, subjective norms, intention, and lactation behavior.

to focus on breastfeeding education for drug-abusing mothers, showing the educational gap in this population. By implementing this educational program, it is possible to reduce health costs and damages caused by the lack of exclusive breastfeeding in these infants and to help promote the health of the mother and the baby.

Materials and Methods

This randomized clinical trial study was performed on 52 drug-dependent (e.g., opium, sap, methadone, buprenorphine, and tramadol) mothers who were admitted to the neonatal intensive care unit of Mashhad hospitals after delivery in 2018. The mothers addicted to amphetamines, crack, crystal, marijuana, heroin, and alcohol, who were unable to breastfeed, were excluded from the study. It should be noted that this was a single-blind study and the data analyzer was blind. First, Ommolbanin, Ghaem, Imam Reza, and Hashemi-Nejad hospitals were selected among the hospitals of Mashhad by the proportional allocation sampling method. In the selected hospitals, mothers meeting the required criteria for inclusion and those showing a willingness were included in this study. The samples were randomly divided into two groups of intervention and control using permutation blocks. The permuted block randomization is a method of randomly assigning individuals to study groups. Accordingly, there exist two blocks (i.e., AB and BA) if two groups are available. Given the sample size per block, random integers between 1 and 2 were selected, and subjects were assigned to study groups based on the selected numbers. The estimated sample size was 26 women in each group that was determined based on a pilot study conducted with 20 samples in 2 groups. According to the mean comparison formula (equation 1) in the two groups of the study, a minimum sample size of 26 cases in each group was determined assuming 1% error, 95% power, and a 10% attrition rate.

$$n = \frac{(z_{1-\alpha} + z_{1-\beta})^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_2 - \mu_1)}$$

During 4 months (from November 2018 to February 2019), 63 patients were included in the study and assigned to the intervention (n=31) and control (n=31) groups. However, 5 and 6 patients in the intervention and control groups were excluded for some reasons including an unwillingness to continue the study and prescription of formula by a physician. Finally, 52 mothers remained, including 26 cases in the intervention group and 26 cases in the control group (Figure 1).

The inclusion criteria were obtaining informed consent to participate in the intervention, having the type of drug addiction (i.e., opium, opium gun, methadone, buprenorphine, and tramadol) that the mother can breastfeed, speaking Persian, having minimal literacy to read and write, having a gestational age of 35-42 weeks, having no disease or consuming no medication that could potentially interfere with breastfeeding, suffering from no psychiatric disorders using no psychotropic drugs, and showing no congenital abnormality that can forbid breastfeeding. On the other hand, the exclusion criteria included the unwillingness of the mother for participation, any disease or medication prescribed by a physician that can interfere with breastfeeding, infant death, and prescription of formula for newly-born infants by a physician.

Data collection tools were the questionnaire designed by Research Unit that included the inclusion and exclusion criteria and a form for the collection of personal information containing 20 questions about the mother, the infant, and the spouse. A researcher-made questionnaire was also used for checking the continuation of exclusive breastfeeding (34 yes-no questions), the status of mother-infant rooming-in, infant suckling, the status of the breast, and the way of infant suckling (18 questions), how to breastfeed (6 questions), and the type of breastfeeding (10 questions) that were completed by observing and asking the mother. The scores on the checklist ranged from 0 to 34 marking as poor (0-11), average (12-22), and favorable (23-34) performance. Considering that the multiplication and division of scores have no effect on statistical test results, the scores of checklist dimensions were converted to 100, making group comparison easier. This tool was prepared based on the review of the literature and its content validity ratio (CVR) and content validity index (CVI) was 0.99 based on the opinion of 7 specialists. Moreover, another applied instrument was the standard questionnaire of the theory of the planned behavior for exclusive breastfeeding, which was modified after obtaining the permission of the tool designer for applicability to drug-abusing mothers. This theory was developed in 2014 by Alami et al and includes 25 questions (17). In the original version, the Cronbach's alpha coefficient was 0.79 and the value of the intraclass correlation coefficient (ICC) index was obtained at the rate of 0.81. The modified questionnaire consisted of 30 questions related to the theory of planned behavior

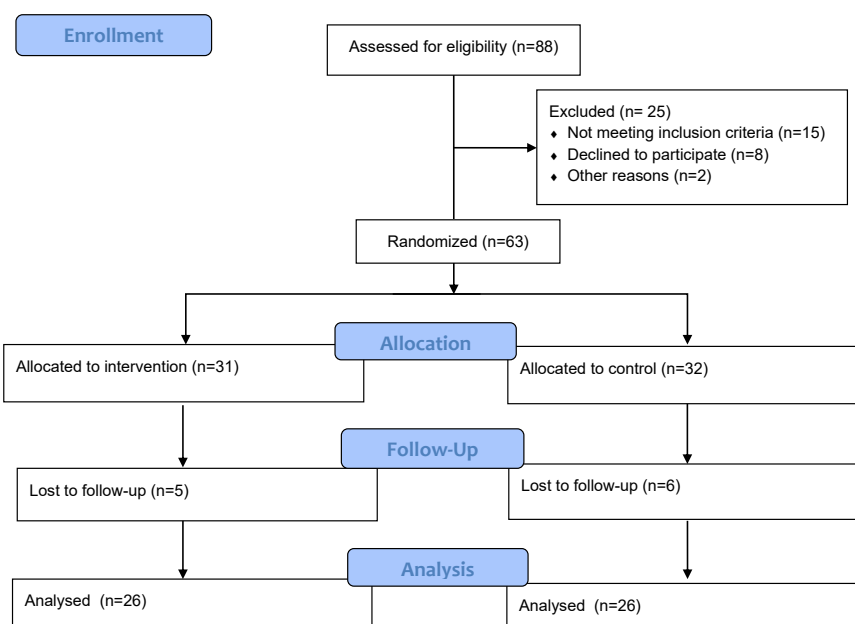


Diagram 1. CONSORT Flow Diagram of the study.

structures in the areas of exclusive breastfeeding in drug-dependent mothers and included attitudes (9 questions), subjective norms (7 questions), perceived behavioral control (4 questions), behavioral intention (3 questions), and awareness (7 questions). The process of scoring was based on a 4-point Likert-type scale (“Strongly agree”, “Agree”, “No comment”, “Disagree”, and “Strongly disagree”) ranging from 5 to 1 on the basis of the question, and desirability of the answer, respectively. The validity of the breastfeeding checklist was determined by face and content validity. The opinions of 10 drug-dependent mothers and seven faculty members of Mashhad School of Nursing and Midwifery were considered to determine face validity. These questionnaire forms were arranged or selected by studying new books and articles and then submitted to 7 faculty members of Mashhad School of Nursing and Midwifery, and the tool was finalized after making suggestions and corrections. For this purpose, seven copies of questionnaire forms and the breastfeeding checklist were submitted to 7 faculty members of the Department of Nursing and Midwifery of Mashhad University of Medical Sciences for content validity. Finally, the questionnaire with a CVR and CVI of 0.99 and 0.79 were confirmed, respectively. For the reliability assessment of the questionnaire of the planned behavior theory for exclusive breastfeeding in the study population, internal consistency was calculated using the Cronbach’s alpha coefficient and the test-retest method. With the aid of the ICC index of 0.88, the internal consistency of the designed tool was confirmed. The reliability of the designed checklist was also assessed by a test-retest method.

For the performance of the breastfeeding training in the

first phase of the theory of planned behavior structures and awareness, 20 drug-addicted mothers were evaluated to identify the most effective predictor structures in the intent and duration of exclusive breastfeeding. The structures of consciousness, subjective norms, perceived behavioral control, and attitudes had the highest effect on behavioral intention, respectively. In the second stage, based on the results of the pilot study, educational interventions were conducted on 26 drug-dependent mothers as the intervention group in 4 separate training sessions each lasting 45-60 minutes during four days in the hospital. The mothers in the control group received routine hospital training on how to breastfeed, and the educational contents in the intervention group were in agreement with the components of the theory of planned behavior that was in accordance with the latest version of two books compiled by the Ministry of Health, namely, “Iranian Breastfeeding Education” and “The Guide for the Management of Substance Dependency in Pregnancy, Childbirth, Breastfeeding, and Infancy.” Behavioral goals were elucidated for each training session, and it was attempted to achieve the set goals using various methods, including question and answer and individual counseling. Educational materials such as educational pamphlets were used to facilitate the educational process. The content of training sessions is presented in Table 1.

The assessment of breastfeeding continuity was performed at 2 and 4 months postpartum at the time of referral to the health centers for vaccination in both intervention and control groups. Moreover, the evaluation checklist of the continued exclusive breastfeeding and the questionnaire of the planned behavior theory were completed again. For easier access to the mothers in the

Table 1. The Content of Breastfeeding Training Sessions for Mothers in the Intervention Group

Session	Content
1	Raising awareness of drug-abusing mothers about NAS and its symptoms, as well as mothers' supportive interventions to care for these infants
2	Changing drug-dependent mothers' attitudes toward the benefits and importance of breastfeeding, especially for reducing the symptoms of NAS and resolving mothers' mental misconceptions about breastfeeding
3	Managing mothers' perceived behavioral control on natural breastfeeding by teaching them how to breastfeed properly and maintain lactation to overcome breastfeeding problems
4	Given the importance of maternal subjective norms on behavioral intent for choosing the breastfeeding method, the person who has had the most influence on the mother (e.g., a friend, mother, and the like) was invited to freely participate in the training session, discussing their positive and negative views in the presence of the mother. The positive and negative consequences of breastfeeding and the importance of mother support were discussed as well. The training session was also held for the husbands of women (if they had a spouse) in one of the ways: indirectly (pamphlet presentation), by phone call, or the mothers.

Note. NAS: Neonatal deprivation syndrome.

questionnaire, the first name and address of the health center covered during pregnancy were obtained from the mothers, and a telephone call was made during the course of the experiment.

Data Analyses

Data were analyzed using the SPSS software (version 16), and parametric and nonparametric statistical tests were performed, including independent *t* test, Mann-Whitney, chi-square, Fisher exact test, Wilcoxon, and Friedman test. The level of statistical significance was set at $P < 0.05$.

Results

The mean age of the mothers was 31.5 ± 6.2 and 32.3 ± 0.6 years old in the intervention and control groups, respectively ($P = 0.619$). The adjustment of the measured variables in the intervention and control groups is one of the essential features of the experimental studies. According to the results of independent *t* test, chi-square, Mann-Whitney, Fisher exact tests, there was no significant difference between the intervention and control groups in terms of age, employment status of the mother, educational status of the mother and her spouse, family income, type of the applied drug by the mother, spouse addiction, and the infant's birth rate and weight.

Table 2 lists the frequency distribution of mothers using drugs according to the type of the consumed substance in the intervention and control groups.

Regarding the dependent variables of the study, the rate of lactation with breast, formula, and a combination of both was compared between the two groups 2 and 4 months after gestation. As shown in Table 3, 88.5% of drug-dependent and 3.8% of drug-abusing mothers in the intervention and control groups breastfed their infants two months after delivery, respectively. The results of the Chi-square test showed a significant difference between the two experimental groups after the intervention ($P < 0.001$). Additionally, four months after delivery, 65.4% of drug-abusing and 0% of drug-dependent mothers in the intervention and control groups breastfed their infants, respectively. Based on the statistical results of the chi-square test, a significant difference was found between the

two experimental groups after the intervention ($P < 0.001$).

The results further demonstrated that the mean score of maternal performance on the continuation of exclusive breastfeeding was 91.8 ± 9.2 and 50.8 ± 24.5 in the intervention and control groups two months after delivery, respectively (Table 4). Four months after delivery, it was 89.0 ± 8.7 and 31.0 ± 15.9 in the intervention and control groups, respectively. Wilcoxon test results represented significant differences between the groups in 2 and 4 months ($P < 0.001$).

According to data in Table 5, mothers' breastfeeding performance was measured 2 and 4 months after delivery. The results revealed that 96.2% and 26.9% of drug-addicted and drug-dependent mothers in the intervention and control groups breastfed their newborns with desirable performance after two months of delivery, respectively. The Mann-Whitney test results indicated a significant difference between the two groups two months after the intervention ($P < 0.001$). Four months after the intervention, 100% and 3.8% of mothers in the intervention and control groups breastfed their infants with desirable performance, respectively. Based on the Mann-Whitney test results, a significant difference was observed between the two experimental groups ($P < 0.001$).

Table 6 provides the comparison of the mean scores of the theory of planned behavior structures before and after the educational intervention in the experimental and control groups. According to the results, there was no significant

Table 2. Frequency Distribution of Mothers Using Drugs According to the Type of the Applied Substance in the Intervention and Control Groups

The Type of the Substance	Group	
	Intervention Number (%)	Control Number (%)
Opium	6 (23.1)	8 (30.8)
Sap	8 (30.8)	2 (7.7)
Opium and sap	3 (11.5)	7 (26.9)
Methadone	7 (26.9)	9 (34.6)
Tramadol	1 (3.8)	0 (0.0)
Buprenorphine	1 (3.8)	0 (0.0)
Total	26 (100.0)	26 (100.0)

Table 3. Breastfeeding Frequency at 2 and 4 Months After Delivery in Intervention and Control Groups

Variables	Group		Chi-square Test Results
	Intervention Number (%)	Control Number (%)	
Two Months After Intervention			
Formula	0 (0.0)	6 (23.1)	<0.001*
Formula + other liquids	0 (0/0)	7 (26.9)	<0.001*
Formula + cow milk + other liquids	0 (0/0)	1 (3/8)	<0.001*
Breast milk	23 (88/5)	1 (3/8)	<0.001*
Breast milk + other liquids	0 (0/0)	1 (3/8)	<0.001*
Breast milk+ formula	3 (11.5)	3 (11.5)	<0.001*
Breast milk + Formula + other liquids	0 (0/0)	5 (19.2)	<0.001*
Breast milk + Formula cow milk	0 (0/0)	1 (3.8)	<0.001*
Breast milk ++ Formula foodstuffs	0 (0/0)	1 (3.8)	<0.001*
Total	26 (100.0)	26 (100.0)	<0.001*
Four Months After Intervention			
Formula + other liquids	0 (0/0)	15 (57.7)	<0.001*
Formula + foodstuffs other liquids +	0 (0/0)	3 (11.5)	<0.001*
Formula + cow milk + other liquids	0 (0/0)	3 (11.5)	<0.001*
Breast milk	17 (65.4)	0 (0/0)	<0.001*
Breast milk + other liquids	2 (7.7)	0 (0/0)	<0.001*
Breast milk + formula	5 (19.2)	0 (0/0)	<0.001*
Breast milk ++ formula other liquids	2 (7.7)	3 (11.5)	<0.001*
Total	26 (100.0)	26 (100.0)	<0.001*

Note. *Df=10, Chi²=42.2.

Table 4. The Average Score of the Breastfeeding Performance of Mothers in 2 and 4 Months After Delivery in Intervention and Control Groups

Breastfeeding Performance	Group		Between Groups Test Result
	Intervention Mean ± SD	Control Mean ± SD	
Two months after intervention	91.8±9.2	50.8±24.5	<0.001 ^a
Four months after intervention	89.0±8.7	31.0±15.9	<0.001 ^a
The difference between four months later than two months	-2.8±11.8	-19.8±18.3	<0.001 ^a
Within-groups test result	0.249 ^b	<0.001 ^b	

Note. SD: Standard deviation.

^a Test results of the Mann-Whitney U-test. ^b Test results of the Wilcoxon test.

difference between experimental and control groups in terms of awareness, attitude, perceived behavioral control, subjective norms, intention, and lactation behavior before the intervention ($P > 0.05$). However, a significant difference was found between experimental and control groups with respect to the awareness, attitude, perceived behavioral control, subjective norms, intention, and lactation behavior immediately after the educational intervention and two and four months after delivery ($P < 0.001$).

Implication of Results

The results of this study showed the effectiveness of breastfeeding training based on the theory of planned behavior on the continuation of exclusive breastfeeding in mothers who use drugs. Hospitals should support breastfeeding as part of the early intervention in drug-dependent mothers who are not prohibited from breastfeeding. Health professionals (i.e., midwives,

nurses, physicians, and trained volunteers), who have received breastfeeding training, can also receive training sessions, counseling, and support to increase the start and continuation of exclusive breastfeeding for mothers. In addition, holding training classes for promoting breastfeeding in all health centers, as well as training workshops for staff for getting acquainted with the models and theories of health education and health promotion can be in line with promoting exclusive breastfeeding.

Discussion

The purpose of this study was to determine the impact of the educational program based on the theory of planned behavior on the continuation of exclusive breastfeeding on 52 drug-addicted mothers in Mashhad. Regarding the increase in the rate of exclusive breastfeeding in the two periods of the study in the intervention group, the results revealed the positive effect of the educational program on increasing the exclusive breastfeeding continuity of

Table 5. The Frequency Distribution of Drug-Addicted Mothers According to Breastfeeding Performance 2 and 4 Months After the Intervention in the Intervention and Control Groups

Variables	Group		P Value
	Intervention No. (%)	Control No. (%)	
Two months after intervention			
Undesirable	0 (0/0)	9 (34.6)	<0.001 ^a
Normal	1 (3.8)	10 (38.5)	
Desirable	25 (96.2)	7 (26.9)	
Total	26 (100.0)	26 (100.0)	
Four months after intervention			
Undesirable	0 (0/0)	18 (69.2)	<0.001 ^a
Normal	0 (0/0)	7 (26.9)	
Desirable	26 (100.0)	1 (3.8)	
Total	26 (100.0)	26 (100.0)	

^a Test results of the Mann-Whitney U-test.

substance-addicted mothers. Some studies reported that an effective educational program for mothers with child health-related problems is critical (18,19). In line with our findings, researchers observed a greater increase in

the breastfeeding rate with promotion interventions in developing countries (20). Furthermore, another study compared two methods of education (e.g., face-to-face and small group education) to assess the effect of educational programs on the possible increase of self-efficacy in exclusive breastfeeding in pregnant mothers. They concluded that the face-to-face education method has positive effects on the infant's feeding pattern, mother's performance, breastfeeding satisfaction, and beliefs, along with self-efficacy (21). Other studies (16m22) reported that the educational intervention improved the performance of breastfeeding in mothers. The reasons for this congruence can be the effectiveness of educational interventions on optimal breastfeeding performance and thus the continuation of exclusive breastfeeding in mothers given that drug-dependent mothers are almost forgotten in health education programs. In addition, the prevailing approach is that they should not breastfeed their child, lest their baby become addicted, and there is the same belief among health care workers, leading to the negligence of the education of this group of mothers. In the present study, providing an educational program based on

Table 6. The Means and Standard Deviations of the Examined Structures of Drug-abusing Mothers Before and After the Intervention Between Intervention and Control Groups

Structures	Groups		Between-Groups Test Results
	Intervention (26 individuals) Mean ± SD	Control (26 individuals) Mean ± SD	
Awareness			
Before intervention	20 ± 3.9	19.6 ± 3.5	0.681 ^a
Immediately after the intervention	31.2 ± 3.0	19.5 ± 3.9	<0.001 ^a
2 months after intervention	31.5 ± 1.9	18.7 ± 3.8	<0.001 ^a
4 months after intervention	30.9 ± 2.0	18.7 ± 4.0	<0.001 ^a
Within Groups test result	<i>P</i> <0.001 ^b	<i>P</i> =0.017 ⁺	
Attitude			
Before intervention	38.6 ± 3.4	37.8 ± 4.1	0.399 ^a
Immediately after the intervention	42.3 ± 2.0	37.8 ± 4	<0.001 ^a
2 months after intervention	42.1 ± 2.1	36.5 ± 3.8	<0.001 ^a
4 months after intervention	41.5 ± 3.1	36.2 ± 3.7	<0.001 ^a
Within Groups test result	<i>P</i> <0.001 ^b	<i>P</i> =0.005 ⁺	
Subjective norms			
Before intervention	25.8 ± 4.1	24.1 ± 4.5	0.057 ^a
Immediately after the intervention	28.3 ± 2.0	24.1 ± 4.4	<0.001 ^a
2 months after intervention	29.2 ± 2.0	23.0 ± 3.4	<0.001 ^a
4 months after intervention	29.0 ± 2.3	22.5 ± 3.5	<0.001 ^a
Within Groups test result	<i>P</i> <0.001 ^b	<i>P</i> =0.007 ⁺	
Perceived behavioral control			
Before intervention	14.1 ± 2.6	13.7 ± 2.7	0.563 ^a
Immediately after the intervention	17.2 ± 2.0	14.0 ± 3.0	<0.001 ^a
2 months after intervention	17.0 ± 2.4	10.7 ± 1.8	<0.001 ^a
4 months after intervention	16.5 ± 2.9	9.4 ± 1.7	<0.001 ^a
Within Groups test result	<i>P</i> <0.001 ^b	<i>P</i> <0.001 ⁺	
Behavioral intention			
Before intervention	10.7 ± 3.0	9.7 ± 3.0	0.304 ^a
Immediately after the intervention	14.5 ± 0.9	10.4 ± 2.7	<0.001 ^a
2 months after intervention	14.1 ± 1.4	8.0 ± 2.1	<0.001 ^a
4 months after intervention	13.7 ± 1.9	6.7 ± 1.2	<0.001 ^a
Within Groups test result	<i>P</i> <0.001 ^b	<i>P</i> <0.001 ⁺	

Note. SD: Standard deviation; ^a Mann-Whitney test results; ^b Friedman test results.

the theory of planned behavior with a significant increase in theoretical knowledge and structures (i.e., attitude, subjective norms, perceived behavioral control, and behavioral intention) led to an increase in the performance of continued exclusive breastfeeding in these mothers. Further, there was a significant increase in the mean score of mothers' awareness in the intervention group while a marked decrease in the mean score of awareness in the control group. One study focused on assessing the effect of educational interventions on the breastfeeding behavior of 100 drug-dependent mothers based on the theory of planned behavior. After three sessions of intervention, there was a significant difference between intervention and control groups in terms of the mean scores of awareness ($P < 0.05$). In this study, the rate of awareness in the control group was not significantly changed when compared with the intervention group (23). The results of the above-mentioned study are consistent with those of the present study although intra-group findings between the four stages in the control group showed a significant decrease in the mean scores of awareness in drug-abusing mothers. This could be due to the lack of knowledge of health care providers about breastfeeding of drug-addicted mothers or the absence of national guidelines for breastfeeding in drug-abusing mothers and providing inaccurate training to these women, keeping them away from the breastfeeding of their infants.

On the other hand, there are no support systems in which drug-addicted mothers can act as knowledge channels to provide their views and experiences on the general management of breastfeeding. Additionally, the results of (24) confirmed the impact of educational interventions on increasing mothers' knowledge, which is in line with the findings of the present study. In the current research, an increase in the mean score of attitudes in the intervention group is in agreement with the finding of another study, suggesting the positive effect of educational interventions on mothers' attitudes toward exclusive breastfeeding. Conversely, there was a significant reduction in the attitude of mothers in the control group, which may stem from their unpleasant feelings and experiences during the lactation period since attitudes originate from personal or surrogate experiences through observational learning from others. Therefore, positive beliefs about a given behavior are reinforced and continue as motivation after directly experiencing a particular behavior. Further, an attitude refers to emotions arising from behavior, and the experience of pleasant emotions can influence its promotion and persistence (25). An increase in the score of subjective norms in the present study highlights the effect of educational intervention on subjective norms. In line with our findings, a study investigated the impact of the education program using the theory of planned behavior on the choice of breastfeeding in drug-dependent mothers and reported that the mean score of subjective norms

significantly increased in the intervention group while decreasing in the control group (26). In other words, higher degrees of subjective norms in this study denote higher enthusiasm of mothers and the influence of individuals in their lives, including their spouses and mothers regarding breastfeeding their infants. The reduction of subjective norms in the control group could be due to the lack of support from the relatives of drug-dependent mothers (i.e., family members, friends, neighbors, physicians, and health personnel) and their negative attitudes toward breastfeeding and the fear of the transmission of narcotics through breast milk to infants, which plays an essential role in mothers' tendency to use powdered milk. In the present study, a decrease in the mean score of perceived behavioral control in the intervention group might be attributed to the lack of self-esteem, feeling of desperation about the suckling of the infant, and feeling guilty, preventing drug-dependent mothers to attempt to breastfeed their infants. Given the increased perceived behavioral control in the intervention group, it seems that designing and conducting educational programs based on the theories and patterns of behavior changes would be highly useful in the enhancement of perceived behavioral control, which corroborates with the results of previous studies (23,24,27). In the current study, a significant increase in behavioral intention in the intervention group indicated that the improvement of attitude, subjective norms, and perceived behavioral control following educational interventions led to acceptable behavioral intention, which is the most crucial determinant of one's behavior. In a similar study (28), researchers found that breastfeeding intention and behavior of the studied women increased after the intervention, which is in line with the results of the current investigation. One of the limitations of the present study, which mostly exists in human studies, was the paucity of the control of the researcher over the subjects during the experiment and the follow-up of specimens, especially in the context of exclusive breastfeeding. The self-report method was used to evaluate the subjects in exclusive breastfeeding because it was impossible to track the individuals' behavior during 4 months. In addition, the influence of some factors (e.g., personality traits, individual differences, and mental states of mothers when responding to the questionnaire) was out of the control of the researcher, which is considered as another limitation of the current study. In this regard, holding training sessions, organizing workshops for health care providers to familiarize themselves with the models and theories of health education and health promotion can be used to promote exclusive breastfeeding and manage the existing barriers. It is suggested that the education of continued breastfeeding be designed based on the other theories of health education and promotion, and their results will be compared with the findings of the present study.

Limitations

The self-report method was used to evaluate individuals in the field of exclusive breastfeeding due to the nature of the study. Further, the effect of some factors (e.g., personality traits, individual differences, and mental states of mothers when answering the questionnaire) was beyond the control of the researcher, which was another limitation of the present study.

Authors' Contribution

FS, GHZ, MR and JJ: concept and design. FS, MR and JJ: data collection and interpretation of the data. FS and MR: performing of the study and writing of the draft. All authors read and approved the study.

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Issues

This study was registered in the Iranian Registry of Clinical Trials (identifier: IRCT20180805040710N1; <https://www.irct.ir/trial/35502>) and approved by the Ethics Committee of Mashhad University of Medical Sciences (with an ethics code of IR.MUMS.NURSE.REC.1397.002). The study participants were allowed to withdraw from the study whenever they wanted and were assured of data confidentiality.

Financial Support

This study was funded by Mashhad University of Medical Sciences.

Acknowledgments

This study was extracted from an M.Sc. thesis in the field of community health nursing and funded by Mashhad University of Medical Sciences with a grant research number of 961730. We would like to thank the Research Deputy of Mashhad University of Medical Sciences, the respected staff of the hospitals, and all beloved mothers who participated in this research.

References

1. Clara KB. 849 Breast feeding practices among working mothers attending 'postnatal' clinics in two hospital in Kampala, Uganda. *Occup Environ Med.* 2018;75(Suppl 2):A537. doi:10.1136/oemed-2018-ICOHabstracts.1523
2. Capponi I, Roland F. Relationship between emotional labelling of breastfeeding situation and intention to breastfeed/support breastfeeding among French adolescents and young people. *J Public Health.* 2021;29(1):135-144. doi:10.1007/s10389-019-01037-9
3. Ramezani M, Aemmi SZ, Emami Moghadam Z. Factors affecting the rate of pediatric pneumonia in developing countries: a review and literature study. *Int J Pediatr.* 2015;3(6-2):1173-1181. doi:10.22038/ijp.2015.6179
4. Davanzo R. Controversies in breastfeeding. *Front Pediatr.* 2018;6:278. doi:10.3389/fped.2018.00278
5. Raffaelli G, Cavallaro G, Allegaert K, et al. Neonatal abstinence syndrome: update on diagnostic and therapeutic strategies. *Pharmacotherapy.* 2017;37(7):814-823. doi:10.1002/phar.1954
6. Richardson GA, De Genna NM, Goldschmidt L, Larkby C, Donovan JE. Prenatal cocaine exposure: direct and indirect associations with 21-year-old offspring substance use and behavior problems. *Drug Alcohol Depend.* 2019;195:121-131. doi:10.1016/j.drugalcdep.2018.10.033
7. Pritham UA, Paul JA, Hayes MJ. Opioid dependency in pregnancy and length of stay for neonatal abstinence syndrome. *J Obstet Gynecol Neonatal Nurs.* 2012;41(2):180-190. doi:10.1111/j.1552-6909.2011.01330.x
8. McQueen K, Murphy-Oikonen J. Neonatal abstinence syndrome. *N Engl J Med.* 2016;375(25):2468-2479. doi:10.1056/NEJMra1600879
9. Masoumi Z, Shayan A, Azizi S, Sadeghian A. Incidence of complications among infants born from addicted mothers in Fatemeh hospital in Shahroud city, Iran. *J Biostat Epidemiol.* 2018;4(1):24-29.
10. Penny ME, Creed-Kanashiro HM, Robert RC, Narro MR, Caulfield LE, Black RE. Effectiveness of an educational intervention delivered through the health services to improve nutrition in young children: a cluster-randomised controlled trial. *Lancet.* 2005;365(9474):1863-1872. doi:10.1016/s0140-6736(05)66426-4
11. Sadeghi F, Ramezani M, Kargarkakhki N, Zarifnejhad GH. Investigating the duration of exclusive breastfeeding, the challenges ahead, and methods of extending the lactation period in drug-addicted mothers: a review study. *Crescent J Med Biol Sci.* 2020;7(1):7-16.
12. Wachman EM, Byun J, Philipp BL. Breastfeeding rates among mothers of infants with neonatal abstinence syndrome. *Breastfeed Med.* 2010;5(4):159-164. doi:10.1089/bfm.2009.0079
13. Maleki- Saghooni N, Amel Barez M, Moeindarbari S, Karimi FZ. Investigating the breastfeeding self-efficacy and its related factors in primiparous breastfeeding mothers. *Int J Pediatr.* 2017;5(12):6275-6283. doi:10.22038/ijp.2017.25656.2182
14. Permatasari TA, Sartika RA, Achadi EL, et al. Exclusive breastfeeding intention among pregnant women. *Kesmas National Public Health Journal.* 2018 Feb 28;12(3):134-141. doi:10.21109/kesmas.v12i3.1446
15. Sulaeman ES, Murti B, Setyawan H, Rinawati S. Exclusive breastfeeding behavior model in rural Central Java, Indonesia: the application of theory of planned behavior. *Global J Health Sci.* 2018;10(10):35-49. doi:10.5539/gjhs.v10n10p35
16. Tol A, Majlessi F, Shojaeizadeh D, Esmaelee Shahmirzadi S, Mahmoudi Majdabadi M, Moradian M. Effect of the educational intervention based on the health belief model on the continuation of breastfeeding behavior. *J Nurs Educ.* 2013;2(2):39-47. [Persian].
17. Alami A, Moshki M, Alimardani A. Development and validation of theory of planned behavior questionnaire for exclusive breastfeeding. *J Neyshabur Univ Med Sci.* 2014;2(4):45-53. [Persian].
18. Khajeh M, Sadeghi T, Ramezani M, Derafshi R. Effect of mothers' educational supportive care program on pain intensity and crying duration caused by colic pain in infants aged 1-5 months. *Evid Based Care.* 2019;9(1):7-15. doi:10.22038/ebcj.2019.34342.1872
19. Pilevar N, Ramezani M, Malek A, Behnam Vashani H. Effect of implementing family-centered empowerment model on the quality of life in school-age children diagnosed with rheumatoid arthritis. *Evid Based Care.* 2019;9(2):65-73. doi:10.22038/ebcj.2019.39702.2046
20. Imdad A, Yakoob MY, Bhutta ZA. Effect of breastfeeding promotion interventions on breastfeeding rates, with special focus on developing countries. *BMC Public Health.* 2011;11(Suppl 3):S24. doi:10.1186/1471-2458-11-s3-s24
21. Khorshidifard M, Amini M, Dehghani MR, Zaree N, Pishva N, Zarifanaiey N. Assessment of breastfeeding education by face to face and small-group education methods in mothers' self-efficacy in Kazeroun health centers in 2015. *Womens Health Bull.* 2017;4(3):1-6. doi:10.5812/whb.41919
22. Joshi PC, Angdembe MR, Das SK, Ahmed S, Faruque ASG,

- Ahmed T. Prevalence of exclusive breastfeeding and associated factors among mothers in rural Bangladesh: a cross-sectional study. *Int Breastfeed J*. 2014;9:7. doi:10.1186/1746-4358-9-7
23. Arshad SM, Khani-Jeihooni A, Moradi Z, Kouhpayeh SA, Kashfi SM, Dehghan A. Effect of theory of planned behavior-based educational intervention on breastfeeding behavior in pregnant women in Fasa city, Iran. *J Educ Community Health*. 2017;4(2):55-63. doi:10.21859/jech.4.2.55
24. Bahri N, Bagheri S, Erfani M, Rahmani R, Tolidehi H. The comparison of workshop-training and booklet-offering on knowledge, health beliefs and behavior of breastfeeding after delivery. *Iran J Obstet Gynecol Infertil*. 2012;15(32):14-22. doi:10.22038/ijogi.2012.155
25. Quijano Zavala GG. Attitudinal and Motivational Factors: Performance, Attitude and Motivation Change in a Mexican University Context [dissertation]. University of Southampton; 2017.
26. Ahmadi M, Jahanara S, Moeini B, Nasiri M. Impact of educational program based on the theory of planned behavior on primiparous pregnant women's knowledge and behaviors regarding breast feeding. *J Health Care*. 2014;16(1):19-31. [Persian].
27. Honari F, Miri M, Moasheri BN. Evaluating the effect of educational intervention based on Theory of Planned Behavior on prenatal care of addicted pregnant women. *J Birjand Univ Med Sci*. 2016;23(1):67-77. [Persian].
28. Reece-Stremtan S, Marinelli KA. ABM clinical protocol #21: guidelines for breastfeeding and substance use or substance use disorder, revised 2015. *Breastfeed Med*. 2015;10(3):135-141. doi:10.1089/bfm.2015.9992

© 2021 The Author(s); This is an open-access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.